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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/830,778 | 08/07/2001 | John Cooper | P280281 | 3688 |

909 7590 05/29/2003

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| EXAMINER |
|---|
| BLACKNER, HENRY A |

| ART UNIT | PAPER NUMBER |
|---|---|
| 3641 | |

DATE MAILED: 05/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) |
|---|---|---|
| | 09/830,778 | COOPER ET AL. |
| | Examiner | Art Unit |
| | Henry A. Blackner | 3641 |

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *04 March 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) *20 and 26-28* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15, 18, 19, 21-25, & 29-34* is/are rejected.

7)☒ Claim(s) *16 and 17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 August 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

## DETAILED ACTION

### *Election/Restrictions*

Applicant's election without traverse of species (A) in Paper No. 9 is acknowledged. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### *Information Disclosure Statement*

The information disclosure statement filed 1 May 2001 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

***Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, claim 19 "wherein said igniting device comprises a flame and/or shock wave from an electric match, *a bridge wire*, a shock tube, *a safety fuse*, or *a detonating cord*, which is inserted into the open end of the detonator shell" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

***Specification***

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

The disclosure is objected to because of the following informality: The data that is recorded in Table 1, page 25, does not corroborate the testing parameters as noted in examples 1-19. Appropriate correction is required.

***Claim Objections***

Claims 1, 10, 19, 25, and 30 are objected to because of the following informalities:

1. In regards to claims 1 and 25, the term "*shell*", line 4, was previously identified as a "*hollow detonator shell*".
2. In regards to claim 10, the phrase "*pressurizing initiator*", line 4, was previously identified as a "*high burn-rate pressurizing initiator*".

3. In regards to claim 19, the phrase "*detonator shell*", line 4, was previously identified as a "*hollow detonator shell.*"
4. In regards to claim 30, the phrase "*detonator shell*", lines 3, 5, 6, and 8, was previously identified as a "*hollow detonator shell.*"

Appropriate correction is required.

Claim 6 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Paper No. 9 states that the applicant elects that the high burn-rate pressurizing initiator is comprised of potassium picrate, which is identified in claim 5.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 10, 25, 29, and 30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In regards to claims 1, 25, 29, and 30, a broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this

can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949).

In the present instance, claim 1 recites the broad recitation a detonator comprising: a hollow detonator shell having an open end and a closed end (lines 1-3); an igniting device at the open end of said shell (line 4); an initiating element comprising an initiation portion (line 6); and characterized in that said initiation portion is at least partially contained within a confinement sleeve and comprises an intimate mixture of a relatively large particle size, porous, powdered explosive having interstitial spaces, and a relatively small particle size, high burn-rate pressurizing initiator located within said interstitial spaces (lines 9-13), and the claim also recites optionally a delay element adjacent said igniting device (line 5); an initiating element comprising an initiation portion and optionally a transition portion (lines 6 and 7); and optionally a base charge (line 8) which is the narrower statement of the range/limitation.

In the present instance, claim 25 recites the broad recitation an in-hole detonator comprising: a hollow detonator shell having an open end and a closed end (lines 1-3); an igniting device at the open end of said shell (line 4); an initiating element comprising an initiation portion adjacent said igniting device (lines 6 and 7); a base charge (line 9); and characterized in that said initiation portion is at least partially contained within a confinement sleeve and comprises an intimate mixture of a relatively large particle size, porous, powdered explosive having interstitial spaces, and a relatively small particle size, high burn-rate pressurizing initiator located within

said interstitial spaces (lines 10-14), and the claim also recites optionally a delay element adjacent said igniting device (line 5); an initiating element comprising an initiation portion adjacent said delay element or said igniting device and optionally a transition portion (lines 6-8) which is the narrower statement of the range/limitation.

In the present instance, claim 29 recites the broad recitation an initiating element for use in a detonator comprising an initiation portion wherein said initiation portion is at least partially contained within a confinement sleeve and comprises an intimate mixture of a relatively large particle size, porous, powdered explosive having interstitial spaces, and a relatively small particle size, high burn-rate pressurizing initiator located within said interstitial spaces (lines 1-6), and the claim also recites an initiating element for use in a detonator comprising an initiation portion and optionally a transition portion wherein...(line 2) which is the narrower statement of the range/limitation.

In the present instance, claim 30 recites the broad recitation a process for manufacturing a detonator as claimed in claim 1 comprising, in order: (lines 1 and 2); inserting an initiating element comprising an initiation portion, into said detonator shell (lines 4 and 5); inserting an igniting device into said detonator shell (line 8); and wherein all components are operationally adjacent each other, and wherein said initiation portion comprises an intimate mixture of a relatively large particle size, porous powdered explosive having interstitial spaces, and a relatively small particle size, high burn-rate pressurizing initiator located within said interstitial spaces (lines 9-13), and the claim also recites optionally inserting a base charge into a detonator shell (line 3); inserting an initiating element comprising an initiation portion and optionally, a

transition portion, into said detonator shell (lines 4 and 5); and optionally inserting a delay element into said detonator shell (line 6) which is the narrower statement of the range/limitation.

Claim 10 recites the limitation "said oxidizer" in line 2. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 11, 12, 14, 15, 18, 19, 21, 22, 25, 29, and 30-34 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. Patent No. 5,385,098 to Lindqvist.

In regards to claim 1, Lindqvist clearly illustrates a detonator comprising a hollow detonator shell (1) having an open end and a closed end, an igniting device (6) at the open end of said shell, optionally a delay element (4) adjacent said igniting device, an initiating element (3) comprising an initiation portion and optionally a transition portion, and optionally a base charge (2) characterized in that said initiation portion is at least partially contained within a confinement sleeve and comprises an intimate mixture of a relatively large particle size, porous, powdered explosive having interstitial spaces, and a relatively small particle size, high burn-rate pressurizing initiator located within said interstitial spaces, in figure 2 and column 4 lines 67-68, column 5 line 1, column 6 lines 5-9, lines 16-35, lines 45-51, and lines 62-64, column 7 lines 1-3, lines 6-13, and lines 28-43, column 8 lines 26-39 and lines 66-68, and column 9 lines 1-5 and lines 41-50.

In regards to claim 2, Lindqvist clearly illustrates wherein said porous powdered explosive comprises PETN, RDX, HMX, Tetryl, TNT, or a mixture thereof, in column 4 lines 41-52.

In regards to claim 3, Lindqvist clearly illustrates wherein said porous powdered explosive comprises PETN, in column 4 lines 48-52.

In regards to claim 4, Lindqvist clearly illustrates wherein said PETN has a number average particle size of greater than 100 microns, in column 7 lines 1-3.

In regards to claim 11, Lindqvist clearly illustrates wherein said transition portion comprises PETN, RDX, HMX, Tetryl, or a mixture thereof in column 8 lines 26-39.

In regards to claim 12, see rejections of corresponding parts of claim 11 above.

In regards to claim 14, Lindqvist clearly illustrates wherein said confinement sleeve is a steel, copper, or stainless steel sleeve, in column 8 lines 66-68 and column 9 lines 1-5.

In regards to claim 15, see rejections of corresponding parts of claim 14 above.

In regards to claim 18, Lindqvist clearly illustrates wherein said initiation portion comprises additional binder component, in column 6 lines 50-64.

In regards to claim 19, Lindqvist clearly illustrates wherein said igniting device (6) comprises a flame and/or shock wave from an electric match, a bridge wire, a shock tube, a safety fuse, or a detonating cord, which is inserted into the open end of the detonator shell, in figure 2 and column 7 lines 33-35.

In regards to claim 21, see rejections of corresponding parts of claims 2 and 11 above.

In regards to claim 22, Lindqvist clearly illustrates a detonator as claimed in claim 1 comprising a delay element (4) adjacent said igniting device, so as to form a delay detonator, in figure 2 and column 7 lines 30-32.

In regards to claim 25, see rejections of corresponding parts of claim 1 above.

In regards to claim 29, see rejections of corresponding parts of claim 1 above.

In regards to claim 30, Lindqvist clearly illustrates a process for manufacturing a detonator as claimed in claim 1 comprising in order: optionally inserting a base charge into a detonator shell; inserting an initiating element comprising an initiation portion and optionally, a transition portion, into said detonator shell; optionally inserting a delay element into said detonator shell; and inserting an igniting device into said detonator shell; wherein all components are operationally adjacent each other, and wherein said initiation portion comprises an intimate mixture of a relatively large particle size, porous powdered explosive having interstitial spaces, and a relatively small particle size high burn-rate pressurizing initiator located within said interstitial spaces, in column 10 lines 5-16.

In regards to claim 31, Lindqvist clearly illustrates a process additionally comprising the steps of granulating the initiation portion, in column 6 lines 16-35 and lines 45-68 and column 7 lines 1-3 and lines 6-13.

In regards to claim 32, see rejections of corresponding parts of claim 31 above.

In regards to claim 33, Lindqvist clearly illustrates a method of blasting comprising initiation of an explosive charge utilizing at least one detonator, wherein the at least one detonator is as claimed in claim 1, in column 9 lines 51-63, column 10 lines 17-20 and lines 26-68.

In regards to claim 34, see rejections of corresponding parts of claim 1 above.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 7-9, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lindqvist.

In regards to claim 7, Lindqvist discloses the claimed invention, that the high burn-rate pressurizing initiator is comprised of a mixture of two separate components, an oxidizer "potassium perchlorate" and powdered metals that undergo modification of sensitivity and reaction properties, such as aluminum, manganese, or zirkonium. Lindqvist does not disclose that the powdered metals have a high burn rate at low pressure. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a modified aluminum powder, since it was known in the art that aluminum powder, which is used in the

manufacturing of flash bulbs, when ignited via an electrical igniting device in a low pressure oxygen atmosphere, produces a short duration high intensity light flash.

In regards to claims 8 and 9, see rejections of corresponding parts of claim 7 above.

In regards to claims 23 and 24, Lindqvist discloses the claimed invention except for illustrating that the detonator is impact and propagation resistant. It would have been obvious to one having ordinary skill in the art at the time the invention was made to develop an explosive detonator, which incorporates secondary explosives, since it was known in the art that explosive detonators, which incorporate primary explosives are inherent to full detonation due to any damage, impact, heat or friction that is delivered to the explosive detonator and are able to cause a cascade detonation in closely arranged detonators due to receiving conveyed shock waves from an adjacent detonation, since primary explosives are able to develop full detonation when simulated with an igniting device within a volume of a few cubic millimeters of the explosive, while a secondary explosive can not be detonated under similar conditions.

Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lindqvist in view of Dinegar. Lindqvist discloses the claimed invention except for illustrating that the high burn-rate pressurizing initiator is comprised of potassium picrate. Dinegar teaches in column 1 lines 14-18 and column 3 lines 24-32 and lines 53-55, that a secondary explosive compound is produced with the combination of potassium picrate and PETN or HMX, which can be ignited via low voltage levels. It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ Dinegar's method of producing a secondary explosive compound in order to achieve the desired effect of producing an explosive detonator, which is less hazardous then a primary explosive detonator, due to the reduced sensitivity to shock,

electrostatic charge, and heat and which can be routinely actuated by small amounts of electrical energy.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lindqvist in view of Wang. Lindqvist discloses the claimed invention in column 8 lines 26-39, except for illustrating that the density of the PETN, within the transition portion, is between 1.0 and 1.2 g/ $cm^3$. Wang teaches in column 5 lines 1-14, lines 24-26, and lines 33-45, that an intermediate charge, which is located between the initiating charge, which is comprised of a secondary explosive "PETN" at a density between 1.2 and 1.6 g/$cm^3$, and the base charge, contains a secondary explosive "PETN" that is more loosely pressed than the initiating charge with a density between 0.8 and 1.4 g/ $cm^3$. It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ Wang's method of assembling an explosive detonator, in order to achieve the desired effect of amplifying and increasing the velocity of the shock wave, caused by the ignition of the secondary explosive within the initiating charge, toward the base charge.

***Allowable Subject Matter***

Claim 10 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claims 16 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following publications show the state of the art in the field of Non-Primary Detonators.

U.S. Patent No. 4,956,029 to Hagel et al.

U.S. Patent No. 4,402,268 to Usel

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Henry A. Blackner whose telephone number is 703-305-4799. The examiner can normally be reached on 09:15 - 17:45.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Carone can be reached on 703-306-4198. The fax phone numbers for the organization where this application or proceeding is assigned are 703-306-4196 for regular communications and 703-305-3597 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-5771.

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May 22, 2003

MICHAEL J. CARONE
SUPERVISORY PATENT EXAMINER